

***Evolution on Large-Scale Plasma Structures in Comets:
Kinematics and Physics***

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Strategy

The disconnection event or DE consists of the periodic loss of a comet's entire plasma tail and the growth of a new one. This spectacular phenomenon is not understood. The strategy is to assemble a data base of specific events studied in detail, determine the solar-wind conditions responsible for DEs, and develop a consistent physical model.

Progress and Accomplishments

The basic data for this project consist of (1) the duplicate archive of IHW large-scale images (Boulder, CO) and (2) in situ solar-wind data. A major accomplishment has been the essential completion of the Boulder, CO duplicate archive. Substantial progress has been made in obtaining solar-wind data, but major blocks have not yet appeared in the literature.

Analysis is complete for the sequence of DEs that took place during 13-18 April 1986. The first DE correlates well with a sector boundary crossing for the comet and a group of DEs that occurred approximately a day later could have produced by polarity reversals seen in the IMP-8 data. Thus, these DEs are consistent with the frontside, magnetic reconnection mechanism.

Projected Accomplishments

We expect to complete the analysis of all DEs under study (except 22 February 1986) during the next year and that the broad outline of our results should be apparent.

Publications

Two major papers are in press. (1) The detailed study of the 10 January 1986 DE by M. B. Niedner, J. C. Brandt, and Y. Yi, Proceedings of the 1989 Chapman Conference on Cometary Plasmas. (2) The very long awaited paper by J. C. Brandt: "Large Scale Structure of the Plasma Tail of Comet Halley During the 1985/1986 Apparition". In Comet Halley 1986, Ellis Horwood Ltd., 1991. (3) A paper entitled "The Disconnection Events of 13-18 April 1986 and the Cessation of Plasma Tail Activity in Comet Halley in May 1986" by Y. Yi, J. C.

Brandt, M. Snow, and C. E. Randall is complete and will be submitted shortly (results presented at the AAS Meeting, January 1991, Philadelphia).